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ABSTRACT

The purpose of this study was to investigate the relationship between infants' attachment to mother and mothers' responsiveness to behaviors of her infant. Twenty-four male and 24 female 12-month-old infants and their mothers were videotaped at a laboratory in the Ainsworth-Wittig strange situation and in a series of subsequent situations designed to provide opportunities for distinguishing between levels of maternal responsiveness. In the last of these, a questionnaire situation designed to measure maternal responsiveness, each mother-infant dyad was filmed for 3 minutes in the same room where the mother was asked to fill out the questionnaire and the infant was allowed to explore the room. The room did not contain toys and as such the children could not occupy themselves with toys. Each mother was also told to feel free to interact with her child in any way she liked during this situation. Before leaving the laboratory mothers were asked to complete a toddler temperament scale. Strange situation behavior was scored for proximity and contact seeking, contact maintaining, resistance, and avoidance behavior in accordance with guidelines provided by Ainsworth. Measures of maternal responsiveness to infant behavior in the questionnaire situation were based upon maternal vocalization and touch following infant attentional demands. Results are discussed. It is concluded that the measures designed to assess maternal responsiveness developed in this study, while needing further refinement, appear to be a promising tool for the study of maternal behaviors related to attachment. (Author/RH)

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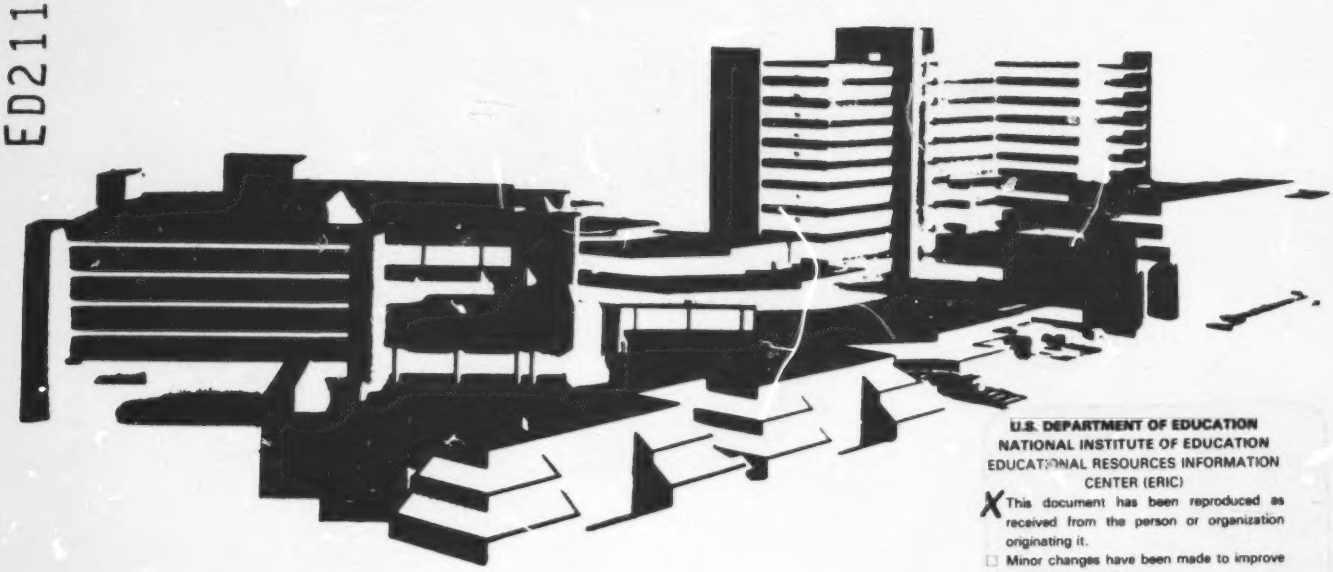

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THE RELATIONSHIP OF MATERNAL RESPONSIVENESS TO MOTHER-INFANT INTERACTION PATTERNS

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ABSTRACT

The study of the development of infant-mother attachment has been a major focus of recent research. One central issue in this research area has been the establishment of reliable and valid measures of attachment. The Ainsworth-Wittig strange situation now appears to be accepted as a tool for assessing infant attachment to mother. The reliability of behavioral clusters developed by Ainsworth for use in measuring attachment in the strange situation has been established. There is also considerable research indicating that these measures provide a valid index of attachment.

Maternal sensitivity has been implicated as an important component in the development of a secure infant-mother relationship. Assessment of maternal sensitivity in previous research has been based upon subjective ratings involving many hours of observation. The primary purpose of this study was to examine the relationship between maternal responsiveness to behaviors of the infant in a brief laboratory observation and interactive behavior patterns in the strange situation.

Forty-eight 12-month-old infants and their mothers were videotaped at a laboratory in the strange situation and in a series of subsequent situations designed to provide opportunities for distinguishing between levels of maternal responsiveness. In the last of these, a questionnaire situation, each mother-infant dyad was filmed for three minutes in the same room where the mother was asked to fill out a questionnaire and the infant was allowed to explore the room without the presence of toys to occupy him or her. This activity was designed to put the mother in a

situation where compliance with the request to fill out the questionnaire would compete with attentional demands of the infant. In an effort to tap some aspect of the infant's contribution to quality of attachment, mothers were also asked to complete a toddler temperament scale.

Strange situation behavior was scored for proximity and contact seeking, contact maintaining, resistance, and avoidance behavior in accordance with guidelines provided by Ainsworth. Measures of maternal responsiveness to infant behavior in the questionnaire situation were based upon maternal vocalization and touch following infant attentional demands. Maternal responsiveness was found to have correlations of .32 with proximity and contact seeking and .36 with contact maintaining. A nonsignificant but consistent trend was found for infants of responsive mothers to receive lower scores than infants of less responsive mothers on strange situation dimensions of resistance and avoidance. No relationship between ratings of infant temperament and strange situation behavior was found.

The measures developed in this study appear to be a promising tool for the study of maternal behaviors related to attachment. Refined measures may account for more of the common variance between maternal responsiveness and infant behavior in the strange situation.

The Relationship of Maternal Responsiveness to

Mother-Infant Interaction Patterns

The purpose of this study was to investigate the relationship between the infant's attachment to mother and the mother's responsiveness to behaviors of her infant. The process of the infant's learning experience in the first social relationship has been of theoretical interest for a long time (e.g., Freud, 1940; Dollard & Miller, 1950; Erickson, 1950). The 1970s have seen a substantial increase in the empirical analysis of this relationship, inspired by the writings of Bowlby (1969, 1973) and Ainsworth (e.g., 1969, 1972, 1973). Bowlby has suggested that the child is born with certain instinctive tendencies (such as crying, sucking, clinging, and smiling) which promote the development of an interactive relationship with the primary adult caregiver and the corresponding development of attachment to that person. A central focus of empirical research precipitated by Bowlby's statements has been the operational definition of attachment.

Definition and Measurement of Attachment

An initial effort at addressing the problems of definition and measurement of attachment was made by Schaffer and Emerson (1964). They proposed that the essence of the attachment function is the tendency of the young to seek proximity of certain members of the species while avoiding proximity of others. As an operational criterion for the existence of an attachment, they chose to use the behavior of the infant when denied such proximity. The child's response and efforts to regain proximity following separation were used to measure the intensity of his or her need for proximity. Schaffer and Emerson acknowledged that the use of such an index did not attend to the varied and intricate process of attachment

formation, but rather attempted to tap the consequence of such a process. They further recognized that separation anxiety might not be the most appropriate means of assessing the attachment bond, since it is merely an index, and not an operational definition of attachment.

Ainsworth and Bell (1970) have also discriminated between infant-mother attachment and the infant's attachment behavior. Attachment refers to the enduring affectional tie formed between infant and mother which tends to be independent of specific situations. Attachment behavior refers to behaviors that share what Bowlby (1969) has called the "predictable outcome" of maintaining a certain degree of proximity to mother and through which the attachment tie is initially formed and later maintained and developed. Bowlby's (1969) notion of the attachment-behavioral system is also utilized by Ainsworth and her colleagues to suggest that the behaviors classed as attachment behavior operate systematically together. This behavioral system is very sensitive to situational factors such that some situations activate it at higher levels of intensity than do other situations. Not only may the intensity with which a system is activated influence the intensity with which a specific behavior is exhibited, but it may also influence which specific attachment behaviors are activated. Given that the attachment behavioral system is only one of several behavioral systems, the extent to which it is evident in behavior will depend in part on its intensity of activation relative to the intensity of activation of other behavioral systems. Although attachment behaviors may be displayed in some situations but not in other situations, the attachment bond is thought of as stable and not meaningfully affected by situational factors.

A focus upon qualitative differences in the organization of attachment behavior (rather than differences in intensity or strength of discrete behaviors) when attempting to tease out individual differences in infant-mother attachment follows naturally from discussions of attachment in the ethological context of Bowlby and Ainsworth.

Some researchers (e.g., Cairns, 1972; Coates, Anderson, & Hartup, 1972a, 1972b; Gewirtz, 1972; Maccoby & Feldman, 1972; Rosenthal, 1973; Weinraub, Brooks, & Lewis, 1977) from other than ethological perspectives have criticized the attachment construct because of a demonstrated lack of stability in and intercorrelation among attachment behaviors. Sroufe and Waters (1977) have noted that such instability is not inconsistent with a view of attachment as an organizational (rather than trait) construct to be evaluated in terms of its integrative potency. They point out that attachment can not be reduced to a set of constant and unvaryingly influential behaviors. Indeed, when attachment is considered as "an affective tie between infant and caregiver and to a behavioral system, flexibly operating in terms of set goals, mediated by feeling, and in interaction with other behavioral systems" (Sroufe and Waters, 1977, p. 1185), contextual influences upon behavior are to be expected.

Ainsworth and co-workers have consistently rejected attempts to assess differences in attachment using quantitative measures alone. Ainsworth and Wittig (1969) developed a behavioral classification system designed to assess the quality of the child's attachment to mother. Classification was based upon patterns of behavior of the 1-year-old evidenced in a standard series of episodes involving the child's introduction with mother to a strange room, entry of an adult female stranger, separation from mother

(but not stranger), being left alone in the strange room, and reunion with the stranger and mother. The classificatory system was offered not as a rigid typography of the way in which human behavior is organized, but rather as a first step toward grasping the organization of complex behavioral data.

The systematic classification was undertaken by grouping infants whose strange situation behavior was alike in as many ways as possible. Eight clusters of infants eventually resulted from this effort and the similarities between some clusters resulted in three main groups (designated A, B, and C) with the clusters retained as subgroups. Group A infants were most noticeable in their avoidance of mother in the reunion episodes. Infants in Group A also had many additional behavioral features in common, including very little crying in separation episodes. A tendency to demonstrate angry resistance to the mother upon reunion, as well as strong interest in proximity to and contact with mother in the reunion episodes, was characteristic of Group C infants. Not all Group B babies showed distress in separation episodes, but all demonstrated interest in gaining proximity to and contact (or at least interaction) with their mothers in the reunion episodes, without evidence of avoidance or resistant behaviors. In addition to the classificatory system, Ainsworth used three kinds of measures to analyze data from the strange situation: (1) incidence of specific behaviors in specific episodes, indicated by the percentage of infants who mainifested each; (2) frequency measures; and (3) special scores for dimensions of interactive behavior. Waters (1978) utilized the strange situation procedure to examine the reliability and stability of individual differences in attachment in a middle-class sample. He observed infants twice in the situation at 12 and

at 18 months of age. Waters' results clearly indicated that the presence or absence of stability of individual differences was a function of the level of analysis. The frequency measures of the adult directed discrete behaviors of looking, glancing, vocalizing, smiling, gesturing, approaching, touching, and holding yielded little evidence of temporal stability. When Waters considered ratings on Ainsworth's five behavior categories of proximity seeking, contact maintaining, proximity and interaction avoiding, contact resisting, and distance interaction, he found clear evidence for stable individual differences, especially in terms of behavior toward mother during reunion following brief separations. Classification data were most stable with 48 of 50 infants being independently reassigned to the same category (secure, anxious avoidant, or anxious ambivalent).

Other work has utilized the strange situation procedure to provide strong evidence in support of the validity of the attachment construct. Security of infant attachment to mother has been linked to important predicted aspects of the child's development, including the infant's level of exploration in a strange situation and interaction with strangers (Ainsworth, Bell, & Stayton, 1971; Sroufe, 1977); quality of exploratory play at age 2 years (Main, 1973); problem solving style at age 2 (Matas, Arend, & Sroufe, 1979); curiosity effectance in preschool and kindergarten children (Arend, Gove, & Sroufe, 1979); and peer relations in preschoolers (Waters, Wippman, & Sroufe, 1979). When combined with the demonstration of stability in measures of quality of attachment (Waters, 1978), these studies strongly indicate that when viewed as an organizational construct measureable by strange situation behavior patterns, attachment can be considered an important and useful construct in understanding the infant-mother relationship.

Analyses of Mother-Infant Interaction

Ainsworth's perspective of attachment necessitates turning to the developmental histories of children when examining questions of attachment formation. Attachment is regarded as having developed out of the child's experiences of interaction with mother. A great deal of attention has been paid in recent years to analyzing and describing mother-infant social interactions.

Great differences exist in the manner in which mothers interact with infants as compared to their interactions with adults. Facial expressions made by mothers for infants are greatly exaggerated in time, usually being slow to form and being held for a long time, as well as in their degree of fullness of display (Stern, 1977). Further, the mother typically uses only a very limited range of facial expressions when interacting with her infant; these tend to be of very high frequency and to be extraordinarily stereotyped. Stern (1977) suggests that while the range of facial expressions is limited, it is quite adequate to signal mother's desire to (1) initiate or invite interaction (by using a mock-surprise expression), (2) maintain or modulate an ongoing interaction (by using a smile or expression of concern), (3) terminate an interaction (by frowning and breaking gaze), or (4) avoid a social interaction (by means of a neutral face and gaze aversion).

In a study of the content of mothers' vocalizations to their infants, Ferguson (1964) demonstrated that across six diverse language groups, mothers use simplified syntax, short utterances, many nonsense sounds, and specific sound transformations when speaking to their infants. Other researchers have described the prosodic features of mothers' speech to infants as including alternations between very high and very low pitch of the voice

(e.g., Snow, 1972; Stern, 1974). Another striking difference between adult-adult speech and vocalizations of mother and child is the frequency with which chorousing replaces turn-taking in vocal interaction, such that the vocalizations are thought by some to serve primarily a bonding function rather than one of information exchange (Schaffer, Collis, & Parsons, 1977; Stern, Jaffe, Beebe, & Bennett, 1975).

Many additional examples of adult cultural norms being violated in mother-infant interaction exist. While adults generally gaze only briefly at adult listeners, mothers spend about 70% of play and feeding time gazing at their infants (Peery & Stern, 1976). Stern (1977) reports that mothers build up a repertoire of face presentations which are continually repeated in interaction with the infant and which are accompanied by some facial expression; these facial presentations are noteworthy because of their exaggeratedly discrete nature, having very specific beginnings and separated by distinct periods of behavioral rests. Finally, the infant's personal space is rarely respected by any adult, including the mother; Bower (1965) has reported that the infant's obvious dislike of this encroachment may be innate, and derived from reflexes evolved to protect the face and eyes. Stern (1977) suggests that mothers' consistent disregard of the infants' discomfort with personal space invasion may serve a useful function in helping the infant interact socially within an intimate distance.

Without doubt, the mother is a very active participant in interactions with her infant, generally having a repertoire of behaviors capable of initiating, maintaining and varying, and terminating social interaction with the child. This fact in no way reduces however, the infant's own level of significance of participation in the mutual interaction process. The

ethological perspective that the infant is predisposed to become an adult (e.g., Richards, 1974) suggests a genetic bias within infants toward interaction with other people from birth. It follows that the infant comes into the world with a repertoire of behaviors designed to encourage such interaction. Even the neonate has extensive reflex-like behaviors which maintain physical contact with the caregiver. These include grasping, rooting, sucking, and adjustment of posture when held. Further, the infant has a variety of signalling behaviors such as smiling and crying which serve to increase proximity or gain physical contact (Ainsworth & Bell, 1970). The infant's use of these behaviors and the repertoire of behaviors with which the mother enters upon her role would be crucial to the development of the child's attachment to mother.

Brazelton, Koslowski, & Main (1974) have reported data which point to qualitatively different behavior patterns of very young infants when interacting with an object and with mother, and moreover, when interacting with a stranger and with mother. They hypothesize that the infant and mother usually develop a system of interaction which allows the infant to signal certain needs to the mother (e.g., a need for less stimulation, signalled by temporary head aversion), allowing her to modify her behavior. Brazelton and his colleaques suggest that the stranger's relative ignorance of the infant's cues is what leads to more 'jagged' styles of interaction than is evident in the smooth reciprocal interaction of the sensitive mother and her child. The 'jagged' style of interaction, characterized by the infant's looking toward the adult, and seemingly receiving too much stimulation, turning completely away before returning briefly again, was not excluded from all mother-infant dyads however. The authors suggest

that exceptions to the usual patterns of a smooth mother-infant interaction, where mother temporarily backs away immediately following the infant's cue of sufficient stimulation (before the infant needs to turn completely away), are the result of mother insensitivity to cues of the infant. Similar conclusions about the deleterious effects for the interaction of mother insensitivity to infant signals of too much or too little stimulation are reported in the literature (e.g., Stern, 1971, 1974).

As the infant grows older, and particularly with the development of locomotion, he/she is able to more overtly seek and achieve interaction with preferred figures. The repertoire of contact maintaining behaviors, such as embracing, clambering up, burying the face in the body of the other person, and scrambling over the person in exploration of the face and body, is expanded. Signalling behaviors remain, and the onset of clearly intentional communication is seen (Ainsworth, Blehar, Waters, & Wall, 1978).

Individual Differences Among Mothers Related to Attachment

Differences in patterns of infant-mother attachment suggest an examination of the infants' developmental histories to uncover common experiences which might have facilitated the development of a certain pattern in one group which distinguishes it from other groups with other patterns of behavior. A major research strategy adopted by Ainsworth is to assess individual differences among mothers and assess how they are related to attachment. The importance of mother sensitivity to infant cues as early as the first quarter of life as well as later during infancy has been strongly implicated in the development of a secure attachment of the child to mother.

Blehar, Lieberman & Ainsworth (1977) related face-to-face interaction between infants and (a) their mothers and (b) an unfamiliar figure observed longitudinally at home between 6 and 15 weeks of age, and quality of attachment as assessed by the strange-situation procedure at 51 weeks of age. The authors found that infants who were later classified as securely attached had been more responsive in early en face interactions than infants classified as anxiously attached; further, their mothers had been more contingently responsive and encouraging of interaction. Infants classified as anxiously attached at 51 weeks of age had been more unresponsive and negative in early en face encounters than had infants classified as securely attached; their mothers had been more likely to be abrupt or impassive. Infants later identified as anxiously attached had also been distinguished in early en face interactions by their responsiveness to mother relative to their responsiveness to the unfamiliar figure: securely attached infants had been more positively responsive to the mother than to the unfamiliar figure whereas anxiously attached infants had not.

In an effort to assess mother sensitivity to infant cues in the fourth quarter of the child's first year and relate this to quality of infant-mother attachment, Ainsworth, Bell, & Stayton (1971, 1974) developed a series of nine-point rating scales to be filled out by observers of mother-infant interaction at home on four occasions between the child's 10th and 12th month. Sensitivity was defined as "the mother's ability to perceive and to interpret accurately the signals and communications implicit in her infant's behavior, and given this understanding, to respond to them appropriately and promptly" (Ainsworth, Bell, & Stayton, 1974, p. 127).

With reference to the first component of mother sensitivity as described by Ainsworth and her colleagues, namely, mother's awareness of the signals, raters of this attribute considered not only mother's accessability to the infant, but also the level of her threshold of awareness (mothers with very low thresholds being alert to the baby's most subtle and understated cues, and mothers with high thresholds perceiving only the most manifest and blatant communications). In addition to her level of awareness, mother's ability to correctly interpret the infant's cues was considered in terms of her empathy and her freedom from distortion by projection, denial, or utilization of other defense mechanisms. Those mothers described as having distorted perceptions were seen as biasing their understanding of the infants with their own wishes and desires; mothers with the least distortion of perceptions were judged to have insight into their own moods and wishes and understanding of how their moods and wishes affected the baby's behavior. In addition to the degree to which the mother gave the baby what he appeared to want, the appropriateness of the mother's responses was related to the amount of stimulation given the baby during play and social interaction. In this sense, the sensitive mother was seen as able to perceive, correctly interpret, and respond to the infant's signs of boredom when understimulated, and of over-excitement, tension, and shifts of intensity or tempo when stimulation had reached a certain limit. Further, appropriate interactions were completed and well-resolved; in contrast were fragmented interactions where the mother might try out a series of behaviors as if searching for some solution to a problem. Finally, a prompt response was one which followed sufficiently closely to the baby's cue that it could be viewed by him as contingent upon his communication.

It was suggested that the latency of mother's response to social communication and signals would yield the best understanding of mother's promptness in responding to infants at this age level; a mother who failed to respond to the baby's greeting, smile, or outstretched arms would be seen as insensitive.

The authors report that in addition to ratings of mother sensitivity-insensitivity being positively correlated with ratings on scales of acceptance-rejection, cooperation-interference, and accessibility-ignoring, mothers of babies classified as securely attached (based on behavior in the Ainsworth strange situation) were rated as more sensitive than were mothers of anxiously attached infants. Such a finding is rich in suggesting areas for further investigation of the relationship between mother sensitivity to infant cues and the quality of attachment.

The measure of sensitivity used by Ainsworth and associates was a rather cumbersome one in that it involved subjective ratings by an observer of the mother's perceived sensitivity in a series of at-home interactions. Such a measure is a strong candidate for halo-effects and other generalizations not necessarily appropriate to the task of assessing mother sensitivity. There is an apparent need for a more objective method of analysis which is not overly complicated in application. As a first step in developing an alternative measure of mother sensitivity, this study began description of interactive behavior patterns of the mother and infant in one of several situations designed to reflect mother responsiveness to behaviors of the infant.

Individual Differences Among Infants Related to Attachment

In her consideration of attachment formation Ainsworth stresses the role of maternal sensitivity to signals of the infant. Although neither she nor her associates deny the important contributions of infant style of behavior to development of attachment, individual stylistic differences among infants have not been of major concern in her research. Clearly, mother-infant social behavior consists of a series of complex interactions in the dyad, and the stylistic differences among infants must be recognized as an important aspect of this relationship. One approach to classifying styles of infant behavior is suggested by the temperament theory of Thomas, Chess, and Birch (1968, 1970).

Thomas and associates suggest that there exist nine inborn characteristics which, present at birth, are the bases of personality. These nine characteristics are represented by the child's (1) motor activity level, (2) rhythmicity, (3) acceptance or withdrawal from new people and situations, (4) adaptability, (5) intensity of responses, (6) mood, (7) persistence, (8) distractability, and (9) threshold to stimuli. Evidence is offered to claim that the individual differences were moderately persistent from birth to 10 years of age. Thomas and associates found that scores on the nine features clustered into three distinctive groupings. They subsequently classified approximately two thirds of their sample of 80 children into one of three categories: easygoing, difficult, and slow to warm up. Children classified as easygoing were distinguished in part by a positive mood, high adaptability, rhythmicity, and acceptance of new people and situations. Difficult children were usually in a negative mood, and approached new people and situations slowly.

Fullard, McDevitt, and Carey (1978) have constructed a 97 item, parent self-report Toddler Temperament Scale designed to permit scoring of infants on Thomas and associates' behavior categories and temperament classifications. The scale was standardized on over 300 children who were classified as difficult (12.3%), slow to warm up (6.2%), intermediate high (14.2%), intermediate low (29.4%), or easy (37.9%). Test-retest reliability was reported for only a one month interval, but indicated moderate reliability. The potential relationship between such classifications and quality of attachment has remained an open question.

The present study examined the behavior of 12-month-olds and their mothers in the strange situation. As a means of reflecting mother-infant interaction, interactive behavior was coded in the form of the proximity and contact seeking, contact maintaining, resistance, and avoidance scales which underlie Ainsworth's system for classifying quality of attachment. Data were not analyzed in terms of the A, B, and C classifications because personal communication with Ainsworth indicated that specialized training is required to make these discriminations. The behavior of infants and mothers was also viewed in a series of feeding, toy, and questionnaire situations, and maternal responsiveness to infant behavior in the questionnaire situation was assessed. As one means of tapping individual differences among infants, maternal ratings of temperament using the Fullard, McDevitt, and Carey scale were related to interactive behavior in the strange situation.

METHOD

Subjects

Forty-eight mother-infant dyads were subjects of the study. Twenty-four infants were male and 24 were female. All infants were observed at the laboratory within 50 to 54 weeks from their date of birth.

Subjects were recruited from among birth announcements in a local newspaper, with the restriction that all infants must have had a birth weight of 2.3 kg. or more. Approximately 50% of the mothers who were contacted by telephone agreed to participate in the study. Completed temperament scales for 46 of the 48 infants were returned; of these, two were rejected because they had been completed by people other than the infants' mothers.

Apparatus and Procedure

Each mother-infant dyad was observed separately at a university laboratory. Prior to coming to the laboratory mothers were mailed an informed consent form which explained their freedom to terminate involvement in the study at any time and for any reason.

Two adjacent rooms connected by a one-way vision mirror served as the experimental room and the observation room. The 3.7-by-3.7 m. experimental room was carpeted, and all but a 2.7-by-2.7 m. square of floor space was partitioned off. Before the arrival of subjects, a child's chair was placed at one end of the square and was surrounded by some toys. Near the other end of the room, by a side wall, was a chair and magazine for the mother, and on the opposite side of the room, a chair for the stranger. The door to the experimental room was at the baby's end of the room and on the stranger's side of the room.

Two videotape cameras were placed behind the barriers in the experimental room. The view provided by each camera was monitored in the observation room where the experimenter selected the picture which best revealed the baby's activities. Videotape recordings were supplemented with the experimenter's written record on the rare occasions when the infant was not sufficiently in view of either camera. A microphone in the experimental room was connected with the videotape recorder to record sounds.

Prior to coming to the laboratory all mothers received a mailing which described in some detail the procedure to be followed in the study. The description of the strange situation included in the mailing followed that given to mothers by Ainsworth and her colleagues (Ainsworth, Blehar, Waters, & Wall, 1978, pp. 323-325).

The first activity of subjects upon arriving at the laboratory was participation in the strange situation, which took approximately 21 minutes to complete. Table 1, taken from Ainsworth, Belhar, Waters, & Wall (1978, p. 37), summarizes the eight episodes of the strange situation.

Insert Table 1 About Here

Two female strangers assisted in the study. Each stranger was involved with 24 of the mother-infant dyads. The strangers were instructed to refrain from unnecessary intervention in order to permit the infant to play, search for mother, or even show distress. However, the strangers were also instructed to approach the babies in Episode 3 and draw their attention to the toys, and to comfort or distract babies who became

distressed in separation episodes. An effort was made to encourage similarity in the strangers' behavior during the strange situation procedure, but strangers did appear to have individual styles of interacting with the babies. Any substantial effect of these possibly differing styles of interaction on the babies' behavior toward mother should be detected by comparing ratings of baby behaviors for subjects involved with Stranger 1 and ratings of baby behaviors for subjects involved with Stranger 2.

The description of the strange situation which was mailed to mothers was supplemented with a summary of episodes which was enclosed in the magazine in the experimental room and by a brief discussion with the mother of her role just prior to beginning the strange situation procedure. Mothers were requested not to initiate any interaction with the child in the preseparation episodes (unless specifically cued to do so) so that the babies' spontaneous behavior could be observed. Maternal behavior in reunion episodes was less controlled by instructions, although some uniformity during the first seconds of reunion was requested.

Three laboratory activities remained after completion of the strange-situation procedure: first, a feeding situation lasting 4 minutes; second, a toy situation lasting 12 minutes; and third, a questionnaire situation lasting 4 minutes. These activities took place in the experimental room and were recorded in the same manner as described for the strange situation.

Immediately prior to the questionnaire situation, the mother was given a questionnaire by the experimenter and was asked to complete it

during the next four minutes. The mother was told that the questionnaire situation would also be videotaped, but that she should feel free to interact with the baby during the questionnaire situation in any way she liked. The absence of restrictions on her behavior such as had been present during the strange situation was stressed. The experimenter then again left the experimental room and returned 4 minutes later to answer any questions which the mother had about the study.

Four mothers received the Toddler Temperament Scale, Part 1 for 1 Year Old Children before leaving the laboratory. The scale was mailed to the remaining mothers with a request to complete and return it for scoring by the experimenter.

Description of Behavior

Strange situation behavior. Videotapes of the strange situation procedure were examined by the experimenter so that scores on four interactive behavior dimensions could be assigned for the reunion episodes of each dyad. The four dimensions were proximity- and contact-seeking behavior, contact maintaining behavior, avoidance, and resistance. Twelve randomly selected videotapes of the strange situation were viewed by an independent scorer so that inter-rater reliability for scoring on each dimension could be determined.

Questionnaire situation behavior. Because it appeared to present an excellent opportunity for reflection of individual differences in mother sensitivity to infant cues (given the involvement of mother in an activity not conducive to fully attending to the infant, and given the possibilities for increased demands by the infant because of the absence of toys and weariness after spending 45 minutes in the laboratory), the questionnaire situation was selected as the one to be analyzed as a first step in devising a measure of mother sensitivity.

Behaviors of the baby and mother in the questionnaire situation were numerically coded and entered through the keyboard of a 'Datamyte 900' (Electro General Corporation, 1977) a hand-held portable data collection system. The Datamyte stores codes and their time of entry, transmitting data on command from its memory to a computer. Thus the frequency and duration (if appropriate) of each coded behavior, as well as the various combinations of simultaneously occurring behaviors, could be determined.

The experimenter began coding by viewing a 3-minute section of the questionnaire situation's videotaped record for each dyad two times, each time coding different categories of behavior. Thus two records of behaviors were created for each dyad. After coding 18 dyads in this manner, it was decided that the second record required more frequent entry of codes than could reliably be accomplished. Consequently, the second record was divided into two parts, and the experimenter then viewed each of the 48 dyads three times, each time coding different behaviors. All three records per dyad began at time 000 (signaled by a dubbed tone) so that they could later by meaningfully merged. Brief definitions of codes recorded in each of records 1, 2, and 3 are given in Table 2. Codes are described as either "momentary" or "duration", in which case there exists at least one other code which is mutually exclusive with it, and which signals its termination.

Insert Table 2 About Here

Refinement of questionnaire situation behavior list. After coding of behavior in the questionnaire situation several behaviors on the

original list were excluded from analysis. Visual regard was excluded because of poor reliability due to an inability to consistently determine where the infant was looking. The groups of behaviors specific to attempts by the infant to obtain the pen and paper being used by mother were also excluded because such behaviors were redundant with other coded behaviors (e.g., contact, vocalization). Infants' idiosyncratic behaviors which had been noted during coding were considered individually in terms of whether they could reasonably be considered as signals to the mother; none were thought to be so and none were included in the analysis. The only idiosyncratic behaviors of mother which were noted during coding involved palying games with the infant; these were considered as possible responses to cues of the infant and were included in the analysis. Thus, the behaviors of the infant which were considered as possible signals to mother and which were included in data analysis were: emitting a non-distressed vocalization, whimpering or whining, crying or screaming, being within mother's arm's length, and being in contact with mother. Mother's behaviors which were considered as possible responses to infant cues and which were included in data analysis were: vocalizing, touching the infant, offering a hand to the infant, having the infant in arms or lap, not being in contact with the pen and paper, and relevant idiosyncratic behaviors.

Data reduction procedures. Because of the many possible combinations of coded behavior, a scoring system was developed to reflect the intensity of infant behavioral cues and intensity of maternal responses. There were two steps to this scoring scheme. The first was to assign ordinal weights to behavior. For example, non-distressed infant vocalizations

received a score of 1 while infant crying received a weight of 3 to reflect its greater salience as a potential cue. The second step involved dividing the three-minute section of coded videotapes into 25 episodes, each 12/100 of a minute (7.2 sec.) long. For each episode the infant received a score which represented the sum of the highest scores received by him or her for each of two clusters of behavior. Similarly, the mother received a score for each episode representing the sum of the highest scores received by her for each of three clusters of behavior. Table 3 lists the scores of all behaviors from the questionnaire situation described in this way and the clusters to which the behaviors were assigned. Behaviors of the mother in each episode were considered to be

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Insert Table 3 About Here

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responses to infant behaviors also occurring in that episode.

RESULTS

Interactive Behavior in the Strange Situation

Reliability. Scoring of interactive behavior in the two reunion episodes (Episodes 5 and 8) of the Ainsworth strange situation was completed by the experimenter. Behavior corresponding to each point of the 7 point rating scales was clearly defined by Ainsworth. However, more judgment on the part of the scorer is sometimes required than is the case in simple behavior checklists. It was therefore necessary to show that satisfactory interscorer agreement could be attained.

Twelve videotapes of the strange situation were randomly selected for viewing by a second observer. Like the experimenter, the second observer assigned a score for each infant on the proximity- and contact-seeking, contact-maintaining, resistance, and avoidance scales for each of the two reunion episodes. Reliability scores were computed by dividing the total agreements by the sum of agreements plus disagreements. The overall index of reliability, considering the eight scores for each of 12 infants, was .854. This approximates interscorer agreement reported by Ainsworth and associates (1978). Reliability of scoring for each of the four dimensions of interactive behavior considered was as follows: proximity- and contact-seeking, .83; contact-maintaining, .92; resistance, .96; and avoidance, .75. Ainsworth has noted that interscorer agreement for the avoidance scale is generally lower than that achieved for other scales, and that special training in scoring the avoidance dimension may be important.

Normative analysis. For all subsequent analyses, each infant's mean score for each interactive behavior was considered. No statistically significant differences resulted from comparison of male and female infants' scores. Comparison of scores for infants involved with Stranger 1 and Stranger 2 also revealed no statistically significant differences. Therefore, the results for males and females, and infants observed with Stranger 1 and Stranger 2, were combined.

The mean scores over all 48 infants were as follows: proximity- and contact-seeking = 3.73 (SD = 1.64), contact-maintaining = 2.86 (SD = 1.67), resistance = 1.32 (SD = 0.81), and avoidance = 2.46 (SD = 1.51). These data resemble the normative findings reported by Ainsworth and associates

(1978), with the exception that infants in the present study tended to receive lower scores on the resistance dimension than did infants studied by Ainsworth.

Information had been obtained from mothers during the questionnaire situation regarding the average number of waking hours per week in which their infants were not under parental care. Pearson correlation coefficients for waking hours out of parental care and interactive behavior scores were calculated. No statistically significant correlations were found.

Infant Behavior in the Questionnaire Situation

Reliability. As previouel, noted, behavior in the questionnaire situation was coded by recording different behaviors in each of three viewings; this system had been developed after attempts to code behavior of 18 dyads in only two viewings per dyad proved unsatisfactory. Records of coded behaviors for the 18 dyads which had been coded on two separate occasions were used in assessing the reliability with which the recorded behaviors led to placement in the same cell of contingency tables. It was acknowledged that because the first method of coding was admittedly flawed the potential existed for an artificially low reliability score. Reliability scores were calculated by dividing the number of agreements by the sum of agreements plus disagreements. Reliability for placement in the contingency table considering the infant's vocal (but not proximity/contact) behavior was .98. Reliability for placement in the contingency table considering the infant's proximity/contact (but not vocal) behavior was .97.

Normative Analyses. A contingency table was constructed for each mother-infant dyad to illustrate the proportion of episodes in which mother responded to infant behaviors of each level of intensity. Intensity of maternal response was also reflected in the table. Table 4 is the contingency table showing the proportion of infant behaviors (vocalizations and proximity/contact behaviors) and mother behaviors considering all dyads.

Insert Table 4 About Here

Examination of the table reveals that infants were scored as providing a signal in 92% of episodes, and that behaviors that could be considered maternal responses to infant cues were present in only 62% of these episodes.

In addition, maternal responsiveness to infant vocal and proximity/contact cues were analyzed separately. The proportions of behaviors for these two conditions are presented in Tables 5 and 6. Table 5 indicates

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Insert Tables 5 and 6 About Here

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that infants vocalized in 72% of episodes and that in 55% of these episodes mothers could be scored as having responded to their infant's vocal behavior. Table 6 reveals that infants gave proximity/contact cues in 73% of episodes and that in 42% of these episodes mothers could be scored as having responded to such cues.

An analysis of sex differences in the questionnaire situation revealed that while male and female infants did not statistically significantly

differ in their proximity/contact behavior, male infants vocalized in significantly more episodes than did female infants (t (46) = 2.46, p < .02). Male infants were also more active in cueing behavior than female infants when vocal and proximity/contact behaviors were considered together (t (46) = 2.06, p < .05). There was not a statistically significant difference in the proportion of episodes in which mothers of males and females responded to behavior of their infants. Therefore the data on maternal responsiveness were considered for mothers of males and mothers of females combined.

No statistically significant correlation was found between the infants' proximity/contact behavior and waking hours out of parents' care. There were small but statistically significant negative correlations between waking hours out of parents' care and the proportion of episodes in which the infants vocalized (r (48) = -.26, p < .04), and the proportion of episodes in which the infant exhibited proximity/contact or vocal cues (r (48) = -.34, p < .01). Hours per week in which the infant is out of parental care was not statistically significantly correlated with any measures of maternal responsiveness to infant behaviors.

Relationship of Measures of Maternal Responsiveness and Infant Temperament to Interactive Behavior Scores

Maternal responsiveness and interactive behaviors. Of major interest in anlaysis of the data is how maternal responsiveness is related to scores on the strange situation scales of proximity- and contact-seeking, contact-maintaining, resistance, and avoidance. Before these correlations can be presented it is important to be confident that levels of infant behavior in the questionnaire situation were not related to strange situation

interactive behavior scores. No statistically significant correlations between level of infant behavior in the questionnaire situation and ratings of interactive behavior in reunion episodes of the strange situation were found for males or females.

The correlations found between measures of maternal responsiveness in the questionnaire situation and interactive behavior in the strange situation are presented in Table 7. Small, but statistically significant

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Insert Table 7 About Here

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positive correlations were found between all measures of maternal responsiveness and infant proximity- and contact-seeking and contact-maintaining. Although there was a consistent trend suggesting negative correlations between measures of maternal responsiveness and infant resistance and avoidance, no statistically significant correlations were found in these comparisons.

In order to further investigate the relationship between measures of maternal responsiveness and interactive behavior in the strange situation, the interactive behavior scores for infants of the 16 most responsive mothers, as indicated by the three measures of responsiveness developed out of the questionnaire situation, were compared with those of the 16 least responsive mothers (i.e., the upper and lower thirds respectively). The results of these t-tests are presented in Table 8. When responsiveness

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Insert Table 8 About Here

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is measured by responses to vocal and proximity/contact behavior combined, infants of the most responsive mothers have statistically significantly

higher scores in strange situation dimensions of proximity- and contact-seeking and contact-maintenance than do infants of the least responsive mothers. When maternal responsiveness to vocal behavior only is considered there is a statistically significant difference in the same direction for proximity- and contact-seeking but not contact-maintenance scores. When maternal responsiveness to proximity/contact behavior only is considered, there is a statistically significant difference in the same direction for contact-maintenance but not proximity- and contact-seeking scores. None of the measures of maternal responsiveness statistically distinguished between high and low scores on resistance or on avoidance, but there is again a consistent trend for infants of the most responsive mothers to be less resistant and less avoidant than infants of the least responsive mothers.

Infant temperament and interactive behavior. No statistically significant correlations were found between any of the nine scales used in assessing infant temperament and any of the scores for interactive behavior in reunion episodes of the strange situation. Because of the small number of infants classified in each of the five categories of temperament, it was not possible to use statistical tests of difference in strange situation scores between the classificatory groups. A *t* test was used to test the difference on each of the four scores for interactive behavior in the strange situation between infants classified as easygoing and infants not classified as easygoing. No statistically significant differences were found as a result of these comparisons.

DISCUSSION

Infant Temperament and Interactive Behavior

Maternal ratings of infant temperament were found to be independent of interactive behavior in the strange situation. This finding is consistent with Ainsworth's premise that maternal responsiveness is more important than the infant's behavioral style in attachment formation. Blehar, Lieberman, and Ainsworth (1977) have reported results supportive of such a position. The focus of their study was to use behaviors observed between the infants' sixth and fifteenth week as predictors of attachment assessed at one year of age. Mothers whose infants were securely attached had encouraged interaction and had been contingently responsive in interaction while mothers of anxiously attached infants had been likely to be inpassive or abrupt. Further, securely attached infants had been more positively responsive to mother than to an unfamiliar figure, while anxiously attached infants had not. Quality of attachment at one year could be predicted with some accuracy when early en face interactions of mother and infant were analyzed. En face interactions of the unfamiliar figure and infant did not have this predictive value. Thus Blehar et al. showed that it was not individual differences in infants' disposition to be socially responsive that was predictive of subsequent attachment; in that sense, their results are consistent with those of the present study.

A second explanation of the lack of relationship between the temperament ratings and behavior in the strange situation is that infant behavior may be a very important factor in attachment formation, but that the scales of temperament used in the present study were insensitive to the type of infant behavior relevant to attachment. Most of the scales used in assessing

temperament do not consider the infant's behavior in the context of interaction with other people, especially mother. Although Ainsworth stresses the role of mother in attachment formation, it is the mother's role only in interaction with the infant upon which attention is focused. Similarly, it may be that an emphasis upon infant behavior will come to yield valuable information only if it is the infant's behavior in interaction with the mother which is stressed.

Maternal Responsiveness and Interactive Behavior

The present study was designed to investigate the relationship between potential measures of maternal responsiveness to infant cues and interactive behavior underlying infant-mother attachment. The results indicate that the measures of responsiveness which were developed did indeed reflect a meaningful relationship between maternal responsiveness and quality of attachment. The data show just as clearly that the measures of responsiveness, in their current state of refinement, have important limitations in accounting for variability of interactive behavior patterns.

The ability to show statistically significant positive correlations between the three measures of maternal responsiveness and the two dimensions of positive interactive behavior (proximity- and contact-seeking and contact-maintaining) which were assessed is impressive. Support for the value of the measures of responsiveness is also obtained from tests which showed that infants of the most responsive third of mothers scored significantly higher on positive dimensions of interactive behavior than did infants of the least responsive third of mothers. Recall that the mean score on the proximity- and contact-seeking dimension for infants of the most responsive mothers (as measured by responsiveness to vocalization and proximity/contact

combined) was 4.59 while the mean score for infants of the least responsive mothers was 3.41. An example of behavior reflective of a score of 4 on this dimension is a spontaneous action by the infant (e.g., a reach or lean) signalling his or her desire to gain contact. On the other hand, an infant who is crying and may be presumed to want contact because he or she stops crying when given contact, but who does not give any specific signal for contact, would be scored 3 on the proximity- and contact-seeking dimension. The mean score on the contact-maintaining dimension for infants of the most responsive mothers (as measured by responsiveness to vocalization and proximity/contact combined) was 3.66 while the mean score for infants of the least responsive mothers was 2.44. An infant who initiated a brief contact once in an episode and showed some additional attachment behavior beyond that necessary to achieve contact (e.g., reclining against the adult, clutching) before breaking away would receive a score of 3 on this dimension. In contrast is an infant who briefly accepts an adult initiated contact and then breaks it, thus receiving a score of 2 on the contact-maintaining scale. Likewise the statistically nonsignificant but consistent negative correlations between the three measures of maternal responsiveness and the two dimensions of negative behavior (resistance and avoidance) which were assessed show potential value for this technique in aiding description of the mother-infant dyad. The fact that there were significant and meaningful relationships between measures of maternal responsiveness and infant behavior in the strange situation despite the very brief period of observation upon which both measures are based is promising.

The data are more sobering in their message that even the significant correlations found between responsiveness and interactive behavior patterns

were relatively small. This suggests that much of the variability of behavior in strange situation reunion episodes was in fact unrelated to behavior analyzed from the questionnaire situation. Because of previous research which suggests a strong relationship between maternal sensitivity and quality of attachment (e.g., Ainsworth, Bell, & Stayton, 1974) the measures used in the present study must be examined for an explanation of the relatively small correlations found.

First, the brief, three minute sample of behavior from which measures of maternal responsiveness were derived may have been inadequate to obtain a representative sample of each mother's responsiveness. In contrast is Ainsworth, Bell, and Stayton's (1974) study in which assessments of maternal sensitivity were based on 64 hours of observation. It may be that not only is a larger sample of maternal behavior necessary, but also samples of behavior across a variety of situations. This suggests that it may be of value to describe and analyze maternal responses to infant cues in the feeding situation and the three episodes of the toy situation in which mothers and infants also participated while at the laboratory. Once maternal responsiveness had been analyzed in these various situations, it would be important to examine the fruitfulness of some combinations of those scores as predictors of attachment quality. Presumably this derived maternal responsiveness score would show a stronger relationship to strange situation behavior because it would be reflective of a longer and more varied sample of maternal responsiveness.

Second, like essentially any laboratory observation, the questionnaire situation may have elicited behavior on the part of the mother that was

very different from behavior in the home environment. Recall that the questionnaire situation was selected for analysis because it was thought to present an excellent opportunity for reflection of individual differences in maternal sensitivity to infant cues. In addition, because the mother and infant had been in the laboratory for approximately 45 minutes by this time, presumably they had become relatively familiar with the general situation. On the other hand, because of a tendency on the part of subjects to want to assist and please the experimenter, mothers might be expected to behave more unusually in the questionnaire situation (in which the task was focused on giving information to the experimenter) than in preceeding situations (in which interaction with the infant was the focus of the task). This would help to explain what seem to be quite low levels of mean maternal responses to infant vocal cues, proximity/contact cues, and vocal and proximity/contact cues combined.

Third, it is clear that arbitrary decisions were made in how to define and score maternal responsiveness to infant cues. There may be other ways of analyzing mothers' behavior that lead to better predictions of infants' behavior in the strange situation. Ainsworth's perspective of attachment emphasizes the importance of maternal sensitivity to infant cues in attachment formation. Measures of responsiveness to infant cues may be quite different from measures of maternal sensitivity to infant cues. Given a response, the appropriateness of that response to the needs of the infant must be considered when assessing sensitivity. Measures of responsiveness as developed in the present study do not distinguish between mothers who appropriately respond to infant cues and mothers who respond to infant cues in an intrusive or equivalently inappropriate manner.

This point brings emphasis to the fact that assessing maternal responsiveness is only the first step in an effort to relate objectively assessed maternal sensitivity and quality of attachment.

Finally, Ainsworth and associates (e.g., Ainsworth, Blehar, Waters, & Wall, 1978; Waters, 1978) have noted that while ratings of interactive behavior in the reunion episodes are stable across time and form the basis of classification of attachment quality, they are somewhat less useful than classification itself in representing individual differences in strange situation behavior. Thus, in any effort to relate measures of maternal responsiveness or sensitivity and patterns of attachment in the strange situation, it will ultimately be important to utilize the classification system and apply this added information when studying the relationship.

In conclusion, the present study has succeeded in developing a measure of maternal responsiveness to infant behaviors. A relationship between this measure and the interactive behavior in reunion episodes of the strange situation which underlies classification of attachment quality was demonstrated. However, the responsiveness measure is in need of considerable refinement before it can be expected to account for a large proportion of the variance in infants' strange situation behavior. Even then, more work will be needed to shape the responsiveness measure into an objective, and not overly complicated, measure of maternal sensitivity. If such a measure can be derived it would be useful in assessing mother-infant relationships in a clinical setting. Furthermore, if means were found to change levels of maternal responsiveness and/or sensitivity, it would be possible to examine the functional relationship between these variables and the quality of the infant's attachment to mother.

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TABLE 1

Summary of Episodes in the Strange Situation

(from Ainsworth, et al., 1978)

Number of Episode	Persons Present	Duration	Brief Description of Action
1	Mother, baby, & experimenter	30 secs.	Experimenter introduces mother & baby to experimental room, then leaves.
2	Mother & baby	3 mins.	Mother is nonparticipant while baby explores; if necessary, play is stimulated after 2 minutes.
3	Stranger, mother & baby	3 mins.	Stranger enters. First minute: stranger silent. Second minute: stranger converses with mother. Third minute: Stranger approaches baby. After 3 minutes mother leaves unobtrusively.
4	Stranger & baby	3 mins. or less[a]	First separation episode. Stranger's behavior is geared to that of baby.
5	Mother & baby	3 mins. or more[b]	First reunion episode. Mother greets and/or comforts baby, then tries to settle him again in play. Mother then leaves, saying "bye-bye".
6	Baby alone	3 mins. or less[a]	Second separation episode.

TABLE 1 (cont.)

Number of Episode	Persons Present	Duration	Brief Description of Action
7	Stranger & baby	3 mins. or less[a]	Continuation of second separation. Stranger enters and gears her behavior to that of baby.
8	Mother & baby	3 mins.	Second reunion episode. Mother enters, greets baby, then picks him up. Meanwhile stranger leaves unobtrusively.

[a] Episode is curtailed if the baby is unduly distressed.

[b] Episode is prolonged if more time is required for the baby to become re-involved in play.

TABLE 2

Questionnaire Situation Behaviors of Baby (B) and Mother (M) Coded in Records 1, 2, and 3

Code	Record	
99	1	B emits non-distressed vocalization. Momentary.
97	1	B cries or screams. Duration.
96	1	B whimpers of whines. Duration.
95	1	B not engaged in 97 or 96. Duration.
88	1	M vocalizes. Momentary.
14	2	B looks at M's face. Duration.
13	2	B not engaged in 14. Duration.
19	3	B in contact with M, and contact not dependent on cooperation of M. Duration.
18	3	B within M's arm's length. Duration.
17	3	B beyond M's arm's length. Duration.
16	3	B's hand reaches for or touches pen or paper. Duration.
15	3	B not engaged in 16. Duration.
33	3	B engaged in idiosyncratic behavior. Duration.
32	3	B not engaged in idiosyncratic behavior. Duration.
28	3	M holds pen or paper away from B. Duration.
27	3	M holds B away from pen or paper. Duration.
26	3	M not engaged in 28 or 27. Duration.
25	3	M touches B with hands, and touching initiated by M. Duration.
24	3	M offers hand to B. Duration.
23	3	M has B in lap or arms. Duration.
22	3	M not engaged in 25, 24, or 23. Duration.
21	3	M in contact with pen or paper. Duration.
29	3	M not engaged in 21. Duration.
44	3	M engaged in idiosyncratic behavior. Duration.
43	3	M not engaged in 44. Duration.

TABLE 3

Scores Assigned Behaviors in the Questionnaire Situation

Cluster	Behavior	Score
Vocalization	B[a] emits non-distressed vocalization	1
Vocalization	B whimpers or whines	2
Vocalization	B crys or screams	3
Proximity/Contact	B within M[b]'s arm's length	1
Proximity/Contact	B in contact with M	2
Vocalization	M vocalizes	1
Proximity/Contact	M offers hand to B	1
Proximity/Contact	M touches B	1
Proximity/Contact	M has B in lap or arms	2
Miscellaneous	M puts down pen/paper	1
Miscellaneous	M displays relative idiosyncratic behavior	1

[a] Baby

[b] Mother

TABLE 4

Proportions of Infant Behavior (vocalization and proximity/contact) and Mother Behavior in Questionnaire Situation by Intensity and Across All Dyads

Intensity of Baby Behavior	Intensity of Mother Behavior			
	0	1	2	3 or greater
0	.070	.011	.002	.000
1	.206	.042	.007	.005
2	.190	.082	.012	.006
3	.118	.076	.016	.004
4	.049	.040	.014	.008
5	.023	.017	.004	.000

TABLE 5

Proportion of Infant Behavior (vocalization only) and Mother Behavior in Questionnaire Situation by Intensity and Across All Dyads

Intensity of Baby Behavior	Intensity of Mother Behavior			
	0	1	2	3 or greater
0	.207	.062	.010	.000
1	.301	.127	.014	.008
2	.072	.046	.017	.010
3	.076	.034	.013	.006

TABLE 6

Proportion of Infant Behavior (proximity/contact only) and Mother Behavior in Questionnaire Situation by Intensity and Across All Dyads

Intensity of Baby Behavior	Intensity of Mother Behavior			
	0	1	2	3 or greater
0	.226	.034	.006	.008
1	.270	.110	.030	.010
2	.142	.124	.030	.009

TABLE 7

Correlations of Maternal Responsiveness in Questionnaire Situation and Interactive Behavior in Strange Situation Across All Subjects

Dimensions of Interactive Behavior	Measures of Maternal Responsiveness		
	Res Voc/Prox[a]	Res Voc[b]	Res Prox[c]
Proximity- and Contact-seeking	$r = .3192$ $p = .014$	$r = .3377$ $p = .009$	$r = .2657$ $p = .034$
Contact-maintaining	$r = .3616$ $p = .006$	$r = .3414$ $p = .009$	$r = .3344$ $p = .010$
Resistance	$r = -.1942$ $p = .093$	$r = -.1836$ $p = .106$	$r = -.2110$ $p = .075$
Avoidance	$r = -.2084$ $p = .078$	$r = -.1804$ $p = .110$	$r = -.2047$ $p = .081$

[a] Responsiveness to vocal and proximity/contact behavior combined

[b] Responsiveness to vocal behavior

[c] Responsiveness to proximity/contact behavior

TABLE 8

Differences in Strange Situation Interactive Behavior Scores

Between Infants of 16 Most Responsive and 16 Least Responsive Mothers

Dimensions of Interactive Behavior	Measures of Maternal Responsiveness					
	Res Voc/Prox[a]		Res Voc[b]		Res Prox[c]	
	Mean	t-Value	Mean	t-Value	Mean	t-Value
Proximity- and contact-seeking						
Responsive	4.594	2.19	4.719	2.31	4.437	1.86
Unresponsive	3.407	$p \leq .037$	3.469	$p \leq .028$	3.406	$p \leq .072$
Contact-maintaining						
Responsive	3.657	2.10	3.719	2.00	3.656	2.19
Unresponsive	2.438	$p \leq .044$	2.531	$p \leq .054$	2.5000	$p \leq .036$
Resistance						
Responsive	1.063	-1.37	1.250	-1.01	1.125	-1.16
Unresponsive	1.500	$P \leq .181$	1.594	$p \leq .319$	1.500	$p \leq .257$
Avoidance						
Responsive	2.094	-1.03	2.062	-1.23	2.125	-1.24
Unresponsive	2.625	$P \leq .313$	2.687	$p \leq .230$	2.812	$p \leq .223$

[a] Responsiveness to vocal and proximity/contact behavior.

[b] Responsiveness to vocal behavior.

[c] Responsiveness to proximity/contact behavior.